## *Populus* spp. strategies to counteract environmental pollutants: phytoremediation perspectives

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Pollution with metals and xenobiotics and climate changes are among the most widespread problems in the environment. Phytoremediation technologies use the plant efficiency in acquiring and concentrating nutrients as well as numerous metabolic activities, providing a low-cost environmental clean-up, that is attracting considerable attention in the past decades. Because of their extensive root system, high biomass production and low-input cultivation, trees are attractive phytoremediators, and poplars, in particular, have been demonstrated tolerant to many abiotic and biotic stresses.

The recent genome sequencing, together with the development of genomics' tools and the ease of genetic transformation of poplar have opened up new avenues for the use of trees in phytoremediation. In our studies we have reported about physiological, biochemical, morphological and molecular responses of hybrid poplar clones to several heavy metals (Zn, Cd, Cu, etc.) present in nutrient solutions or in complex matrices (industrial and agricultural waste) and organic pollutants such as those present in olive mill waste waters. Using the poplar hybrid clone I-214 as a model system, we obtained interesting results for the understanding of tolerance mechanisms to excess and nutrient impairments, also identifying specific genes involved in I-214 (and *Populus*) responses to Zn and other metals. Concerning olive mill waste waters we set up a pilot system of Short Rotation Forestry poplar plantation using I-214 and Monviso clones. The effects of OMWW application will be discussed in terms of modifications in soil and substrate physiochemical properties and plant growth analyses.